UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,906	02/27/2004	Steven D. Girouard	279.696US1	4545

21186 7590 06/22/2009

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER	
REIDEL, JESSICA L	

ART UNIT	PAPER NUMBER
3766	

NOTIFICATION DATE	DELIVERY MODE
06/22/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@slwip.com
scape@slwip.com

Office Action Summary	Application No.	Applicant(s)	
	10/788,906	GIROUARD ET AL.	
	Examiner	Art Unit	
	JESSICA REIDEL	3766	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,10-38,41-148 and 150-152* is/are pending in the application.

4a) Of the above claim(s) *4-7,14-38 and 41-148* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,10-13 and 150-152* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/9/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 9, 2009 has been entered. Claims 8, 9, 39, 40 and 149 were previously cancelled. Claims 1-7, 10-38, 41-148 and 150-152 are currently pending.

Election/Restrictions

2. Claims 4-7, 14-38, and 41-148 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement(s) in the replies filed on October 26, 2005 and May 21, 2008.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on April 9, 2009 has been acknowledged and is being considered by the Examiner. Applicant should note that the large number of references cited (both previously and newly submitted) have been considered by the Examiner in the same manner as other documents in Office search files are considered by the Examiner while conducting a search of the prior art in a proper field of search. See MPEP § 609.05(b). As previously requested in multiple prior Office actions, Applicant is again respectfully requested to indicate any references of those cited which they believe may be of particular relevance of the claimed invention.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 13, and 150-152 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Padua et al. (U.S. 2003/0204206)*** (herein Padua). As to Claims 1, 2, 13, and 152, Padua expressly discloses a system 22 for controlling and regulating production and delivery of therapeutic genes/products comprising one or more sensors for sensing physiological signals indicative of a predetermined cardiac condition and a sensing element, read as an event detector 17, configured to detect a predetermined cardiac condition (i.e. ischemia or reduced blood flow onset) from one or more of the sensed physiological signals and adapted to produce one or more conditions parameters related to the type of the predetermined condition. The conditions parameters (e.g., ST segment elevation or reduction of blood blow in the coronary sinus) are used in a closed-loop control algorithm of the system 22 (see Padua Figs. 11 and 12, page 11, paragraphs 162 and 164, page 12, paragraphs 170-171 and 173 and page 13, paragraphs 181-183). The system 22 of Padua further comprises a gene regulatory signal delivery device (output circuit 12 or Padua Fig. 11 or output pulse generator 74 of Padua Fig. 12) that emits, in response to a gene regulatory control signal, an electric field as a "regulatory signal" which regulates transcription from a regulatable transcriptional control element (i.e. an electrically responsive promoter) in an expression vector (i.e. a plasmid, adenovirus vector, retrovirus vector or the like) having the regulatable transcriptional control element operably linked to an open reading frame, the expression of which treats the predetermined cardiac condition. Padua specifies that the system 22 provides for introducing into at least one cell of a patient, a vector containing an electrically responsive element (ERE) operably linked to a promoter to form an electrically responsive promoter (ERP) that modulates transcription of an operably linked therapeutic product in a cell upon delivery of the electric field regulatory signal to the ERP.

6. Specifically, the genetically engineered ERP is operably linked to a therapeutic gene sequence, the expression of which is controlled by the electric field regulatory signal emitted by the gene regulatory delivery device of the system 22 (see Padua page 1, paragraphs 1-9, page 2, paragraphs 11-12, pages 3-6, paragraphs 59-105, pages 8-10, paragraphs 117-144, page 11, paragraphs 156-161 and page 13, paragraphs 177-180). A "controller" (micro-processor and memory circuitry 15 of Padua Fig. 11 or microcomputer unit 78 of Padua Fig. 12) may be coupled to the one or more sensors and is electrically connected to the gene regulatory signal delivery device (either output circuit 12 or Padua Fig. 11 or output pulse generator 74 of Padua

Fig. 12) for producing a gene regulatory control signal (such as trigger signal provided by digital controller/timer circuit 92). In particular, the controller of the system 22 is adapted to produce the gene regulatory control signal for quantitatively controlling and regulating the electric field regulatory signal. In one embodiment of the system 22 of Padua, the quantitative control is triggered automatically based on the controller of the system 22 receiving the one or more condition parameters related to a type of the predetermined cardiac condition from the event detector 17 (see Padua page 12, paragraph 173). Padua specifies that the system 22 provides "controlled delivery of therapeutic gene products" and that electric field regulatory signal emitted by the gene regulatory signal delivery device of the system 22 "is used to closely modulate the time, frequency, and delivery amount of a given therapeutic product". The emitted electric field regulatory signal is specifically used as a means to control the expression of ERPs that have been transplanted or incorporated into the tissue of a mammal and "controlled expression" is accomplished by closely regulating the emitted electric field regulatory signal through use of the system's controller (see Padua page 1, paragraph 5). In particular, the triggered regulatory control signal may include parameters that quantitatively control emission of the electric field regulatory signal where the parameters include predetermined timing and wave shape parameters for providing a "therapeutically effective amount" or "pharmacologically effective stimulus" for treating the predetermined cardiac condition (see Padua page 5, paragraphs 84 and 88-91, page 9, paragraphs 131-135, page 11, paragraphs 156-161, page 13, paragraphs 179-180 and page 14, paragraph 202).

7. Padua does not disclose expressly that event detector 17 be configured to produce one or more condition parameters related to *a degree* of the predetermined cardiac condition such that the controller of the system 22 quantitatively controls emission of the regulatory signal based on the one or more condition parameters related to *the degree* of the predetermined cardiac condition (emphasis added). Instead, as previously discussed, Padua discloses that event detector 17 is configured to detect a predetermined cardiac condition (i.e. ischemia or reduced blood flow onset) and to produce one or more conditions parameters related to *a type* of the predetermined condition such that the controller of the system 22 quantitatively controls emission of the regulatory signal based on the one or more condition parameters related to *the type* of the predetermined cardiac condition (emphasis added). The Examiner, however,

considers such quantitative control of drug and/or genetic and/or bioagent therapy delivery to be conventional and well known in the art at the time of the invention and cites ***Struble (U.S. 2003/0199813)***, ***Sharma et al. (U.S. 20040088017)*** (herein Sharma), ***Stadler et al. (U.S. 2004/0122478)*** (herein Stadler), and ***Girouard et al. (U.S. 7,072,711)*** (herein Girouard) as evidence of the conventionality of the claimed features. For example, Struble discloses a system 10 including a processor 26 that quantitatively controls drug delivery from a drug delivery device 12 such that the drug selection and/or drug dosage are controlled as a function of the pressure and/or activity level of the patient. In addition, Sharma, Stadler, and Girouard disclose implantable medical devices configured to select a particular therapy, or to select a level or dosage of stimulation and/or drug delivery associated with the therapy, according to an estimated degree of severity of detected ischemic episodes in order to deliver an appropriate level of therapy when ischemia of a specified degree warrants the therapy. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Padua, such that the event detector 17 is configured to detect a predetermined cardiac condition (i.e. ischemia or reduced blood flow onset) and to produce one or more conditions parameters related to a type and degree of the predetermined condition such that the controller of the system 22 quantitatively controls emission of the regulatory signal based on the one or more condition parameters related to the type and degree of the predetermined cardiac condition, since it was known in the art for implantable therapy delivery devices to use such quantitative therapy dosage control for providing for greater specificity and selective control of when and how much therapy (e.g., stimulation and/or drug delivery) to administer to a patient.

8. As to Claim 3, the previously modified Padua reference discloses the essential features of the claimed invention except that it is not specified that the gene regulatory signal delivery device emit an electromagnetic field regulatory signal. Instead, as previously discussed, the gene regulatory signal delivery device of the system 22 (either output circuit 12 or Padua Fig. 11 or output pulse generator 74 of Padua Fig. 12) is coupled to unipolar or bipolar electrodes for forming an electric field generator that emits an electric field as the gene regulatory signal for controlling and regulating the ERP (see, for example, Padua page 2, paragraph 21, page 3, paragraph 60, page 10, paragraphs 145-150 and page 13, paragraph 179). At the time the invention was made, it would have been an obvious matter of design choice to a person of

ordinary skill in the art to modify the gene regulatory signal delivery device of the system taught Padua such that it comprises an electromagnetic field generator for emitting an electromagnetic field as the gene regulatory signal, because Applicant has not disclosed that such modification provides an advantage, is used for a particular purpose or solves a stated problem. Furthermore, the Examiner considers electromagnetic field generators for emitting electromagnetic fields as gene regulatory signals to be conventional and well known in the art of gene therapy for regulating gene expression. The Examiner cites ***Goodman et al. (U.S. 2002/0099026)***, ***Kaplitt et al. (U.S. 2003/0087264)*** and ***Brighton (U.S. 2004/0073260)*** as being just three examples. Accordingly, one of ordinary skill in the art would have expected the system of Padua, and Applicant's invention, to perform to perform equally well with the emitted electric field gene regulatory signal as taught by Padua or the claimed electromagnetic field gene regulatory signal, because both signals would perform the same function of controlling and regulating gene expression in a patient via electrical devices equally well. Therefore, it would have been prima facie obvious to modify Padua to obtain the invention as specified in Claim 3 because such a modification would have been considered a mere design consideration which fails to patentably distinguish over the prior art of Padua.

9. As to Claim 150, in addition to the arguments previously presented, in some embodiments of Padua, the vector is not "part of an implantable device". Padua expressly discloses that the ERP constructs can be delivered directly to tissues of cells of the patient in vivo through the use of an appropriate gene delivery vector (viral or non-viral) through direct injection into the target tissue or through intravenous injection through a catheter (see Padua page 1, paragraph 5 and pages 9-10, paragraphs 131-144).

10. As to Claim 151, in addition to the arguments previously presented, the controller comprises a timer circuit (see Padua Fig. 12 and page 12, paragraph 168) adapted to time a predetermined time period of delivery time during which the gene regulatory signal delivery device emits the regulatory signal/signals (i.e. when a triggering event occurs, as previously discussed). Padua expressly discloses that the controller of the system 22 is used to closely modulate the time, frequency and delivery amount of the therapeutic product and the locus of delivery and specifies that delivery of the therapeutic product can be controlled by the location of the electrodes and the period of electrical stimulation (see Padua page 1, paragraph 5 and page 9,

paragraph 136). The triggered regulatory signals are quantitatively regulated through predetermined timing and wave shape parameters defined by the controller and its timer circuit (see Padua page 12, paragraphs 172-173).

11. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Padua and/or under 35 U.S.C. 103(a) as being unpatentable over Padua as applied to Claim 1 above, and further in view of ***Donahue et al. (U.S. 2002/0155101)*** (herein Donahue). In addition to the arguments previously presented, Padua expressly discloses that implantable pulse generators that are well known in the art may be modified to stimulate the injected/implanted/introduced ERP-cells in accordance with the teachings of the implantable medical device system 22 of Figs. 11 and 12 including a wide variety of microprocessor based implantable pacemakers and implantable pacemaker/cardioverter/defibrillators (see Padua page 11, paragraph 166). A plurality of the implantable pacemakers and implantable pacemaker/cardioverter/defibrillators cited by Padua at page 11, paragraph 166 include event detection circuitry which comprise atrial and ventricular fibrillation detectors such as ***Bardy (U.S. 5,314,430).***

12. Additionally, and/or alternatively, Donahue teaches that it is well known in the art to use a regulatable transcriptional control element in cardiac gene therapy for treatment of any of the following: sinus bradycardia, sinus tachycardia, atrial tachycardia, atrial fibrillation, atrial flutter, atrioventricular nodal block, atrioventricular node reentry tachycardia, atrioventricular reciprocating tachycardia, ventricular tachycardia or ventricular fibrillation (see Donahue page 7, paragraph 94). Donahue also discloses that practice of the invention is broadly compatible with one or a combination of different administration systems (see Donahue page 7, paragraph 88) for more effective and flexible anti-arrhythmic therapies by providing therapeutic methods for administering one or more therapeutic polynucleotides to the heart under conditions sufficient to modulate (increase or decrease) at least one heart electrical property. Donahue further discloses that the invention modulates heart electrical conduction, reconfigures all or part of the cardiac action potential (AP) and reduces or avoids significant disruption of normal electrical function (see Donahue page 2, paragraph 14). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Padua in view of Donahue to administer the gene therapy upon detection of an atrial fibrillation or

ventricular fibrillation to better the system's capabilities of eliminating a wide variety of predetermined cardiac conditions.

Response to Arguments

13. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

15. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to JESSICA REIDEL whose telephone number is (571)272-2129. The Examiner can normally be reached on Monday - Friday, 8:00 AM - 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Carl H. Layno can be reached on (571)272-4949. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessica L. Reidel/
Patent Examiner, Art Unit 3766
June 11, 2009

/Kennedy J. Schaetzle/
Primary Examiner, Art Unit 3766